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THE MARKET FOR MACADAMIA NUTS: AN ECONOMIC ANALYSIS

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Frank S. Scott, Jr. [1/]

INTRODUCTION

The macadamia nut ranks fourth in value among Hawaii's crops and production is expanding at a rate far in excess of that of any other important crop in the state. During 1950, the industry produced 755,000 pounds of macadamia nuts from 860 bearing acres out of a total of 2,150 acres in orchards (Table 1). In 1966, harvested production consisted of 9,075,000 pounds from 3,190 bearing acres out of 6,890 acres in orchards. In mid-1967 it was estimated that 8,000 acres were in orchards of which 3,500 were of bearing age.

The macadamia is particularly well adapted to Hawaii. Except for approximately 500 acres in Australia and 100 acres in Southern California, Hawaii is currently the exclusive commercial source of macadamia nuts.

One of the major problems facing the growing macadamia nut industry is the determination of an acreage and production goal for the entire industry under a given set of economic conditions.

Previous research has indicated that a substantial acreage of suitable land area for macadamia nut production is available in Hawaii and that the market rather than the availability of land will be the limiting factor in the expansion of the industry, except to the extent that the high cost of land would increase the price of the product and thus decrease the quantity which will be taken. Thus, in setting a production goal the researcher is guided by the quantity of macadamia nuts that can be sold at a price adequately covering costs of production, processing, and marketing under a given set of economic conditions. It is not possible to project profitability of production in the long run without an indication of the quantity that can be marketed at a price which covers all costs, including a satisfactory rate of return on the investment at each level. Nor is it possible to make a realistic appraisal of the market potential without a knowledge of production, processing, and marketing costs.

This study is designed to provide an answer to this problem through the determination of the domestic market potential of the industry. An analysis of prospects for sales in foreign markets will be presented in a later publication.

1/ Agricultural Economist, Hawaii Agricultural Experiment Station, and Professor of Agricultural Economics, University of Hawaii.

Table 1. Acreage, production, farm disposition, average price to growers, and value of macadamia nuts in Hawaii, 1950-1966[a/]

Year	Acres		Production		Farm disposition		Price per pound	Value of production
	Total	Bearing	Total[b/]	Having value[b/]	Home use[c/]	Sold		
			1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	Cents	1,000 dollars
1950	2,150	860	755	755	--	755	17.0	128
1951	2,300	840	850	850	--	850	16.9	144
1952	2,770	840	965	965	--	965	17.1	165
1953	2,900	830	970	970	--	970	17.0	165
1954	3,030	1,080	930	930	--	930	17.1	159
1955	3,030	1,300	903	903	--	903	17.9	162
1956	3,200	1,470	1,037	1,027	--	1,027	18.4	189
1957	3,120	1,680	1,343	1,329	--	1,329	18.7	248
1958	3,290	1,750	1,836	1,832	--	1,832	18.5	339
1959	3,840	2,220	2,114	2,112	10	2,102	18.2	382
1960	3,820	2,300	2,609	2,579	10	2,569	18.4	472
1961	3,880	2,430	3,771	3,761	10	3,751	18.5	693
1962	4,100	2,460	5,194	5,194	12	5,182	18.4	954
1963	4,110	2,390	6,015	6,011	8	6,003	17.7	1,061
1964	4,510	2,520	7,872	7,655	16	7,639	15.6	1,190
1965	5,410	2,780	8,649	8,538	16	8,522	19.4	1,651
1966[d/]	6,890	3,190	9,145	9,075	10	9,065	20.0	1,813

a/ Source: Hawaii Crops, Macadamia nuts: acreage, production, disposition, and value, Hawaii Crop and Livestock Reporting Service, December 28, 1966.

b/ In-shell. Difference between production and production having value is economic abandonment.

c/ Data not available prior to 1959.

d/ Preliminary.

PROCEDURE FOR DETERMINING THE MARKET POTENTIAL

The market potential as used in this analysis refers to the total quantity of a product that can be sold under a specified set of economic conditions. The potential can only be realized after compliance with the various conditions has been met. In determining the market potential it is necessary to specify the conditions relating to the sale of the product during the year for which the projection is made. The conditions specified in this analysis are: (1) expected population and per capita income of the market area, which in this instance is the United States, (2) projected sales of competing nuts, and (3) the competitive position of macadamia nut sales in relation to the sales of competing nuts.

Projections of per-capita sales of competing nuts already established in the market may be based to a considerable extent on recent historical trends. However, in the case of macadamia nuts, for which the market is comparatively undeveloped, projections must be determined from controlled tests in areas where the market has been specifically developed for determining comparative sales of the test product, in this case macadamia nuts, and competing products.

Each product tends to lend itself most effectively to certain market outlets. While the industry is in its early stages of development and production is small, the proportion of the total output sold through each type of outlet may be very different from that to be experienced by the same industry as it becomes more mature. Many food products are first introduced at high prices as gourmet items. As volume increases, costs decrease, and consumer awareness and preference increase. The sales of such a product would be expected to gradually broaden into other outlets, thus enabling an expansion in production. The macadamia nut falls into this category.

Those who are closely associated with the macadamia nut industry are well aware that the gourmet market, although the most lucrative outlet for a limited supply, is reaching a point of saturation under existing pricing, promotional, and merchandising conditions. Necessarily, an effort has been made to develop broader markets, and a rapidly increasing proportion of exports of macadamia nuts to the U. S. Mainland is being diverted to lower cost outlets, such as regular nut shelves in grocery stores.

It was in anticipation of these impending conditions that comprehensive marketing and cost studies on macadamia were requested by the industry and initiated by the Department of Agricultural Economics of the University of Hawaii.

The early phases of the marketing research involved a study of consumer demand in the Honolulu market and a retail survey of price and distribution on the West Coast.[2/] The primary purpose of these findings was to provide certain basic information as a guide to controlled research on the U. S. Mainland.

The 1958 Honolulu study indicated that the macadamia nut was the most preferred nut when price was not a factor; that price was, however, an important

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2/ Frank S. Scott, Jr., Characteristics of Consumer Demand for Macadamia Nuts, Agricultural Economics Bulletin 16, Hawaii Agricultural Experiment Station, University of Hawaii, October 1958.

deterrent to sales; that tins would be preferred to jars; and that 90 percent of those who bought macadamia nuts used them for between-meal and cocktail snacks. The amount going into other uses was comparatively minor.

Taking into consideration the results of the Honolulu findings, controlled tests on jars were established in Redlands, California, in May 1959. In the meantime, preparations were made for controlled tests of 6-ounce tins and 6-ounce jars with identical labels in Redlands and Sacramento to be initiated in May 1960. Because of the importance of price and promotion in determining the market potential and in order to conduct research in methods and costs of market development, Redlands and later San Bernardino and Riverside were held as controls with no advertising, and a concentrated television and newspaper advertising program was conducted in Sacramento.

Research data for determining the market potential for macadamia nuts were developed primarily through controlled market tests in Redlands, San Bernardino, Riverside, and Sacramento, California. Tests were carried out in these cities during the following periods: Redlands, June 1959 through June 1965; Sacramento, June 1960 through June 1964; and Riverside-San Bernardino, June 1961 through July 1965.

In all test areas, stores were audited weekly for sales and prices of macadamia nuts and all competing nuts by size and type of container. The survey workers who made these audits were also responsible for assuring availability of stock and proper display of macadamia nuts.

Except for the first year of test sales in Redlands, the product was made available in 6-ounce cans and 6-ounce jars specifically designed for the market tests, as well as the old style 3½-ounce, 7-ounce, and 12-ounce jars which were the only standard containers available at the outset of the research project.

In addition to the advertising research, price tests and container preference tests were incorporated into the broader aspects of the research program. Complete audits were obtained on prices and sales of all competing nuts as well as macadamia nuts in the test areas.

Controlled conditions present a sales environment for measuring the long-run potential and methods and costs of market development. In this way tomorrow's situation is measured today and thus, in spite of sampling errors and lack of complete control of certain variables, the projected environment is far more realistic than the actual but temporary marketing environment for macadamia nuts which existed at the time of the tests.

At the time of the research on the market potential was initiated, retail distribution of macadamia nuts was primarily through gourmet outlets. Consequently, a vital aspect of the research for determining the market potential was to make the nuts available on regular nut shelves in grocery stores, in addition to continuing placement in gourmet outlets.

TINS VERSUS JARS

In Sacramento, 6-ounce cans outsold 6-ounce jars with identical labels and identical pricing at a ratio of 3.3 to 1. In Redlands, the ratio was 2 to 1.

The old conventional macadamia jar fared even less well than the one with a label identical to that of the can. In Sacramento, for every pound of macadamias sold in conventional 3½-ounce jars, combined sales in the 6-ounce cans and jars designed for the research test amounted to 10 pounds. In Redlands, the ratio was 36 pounds in 6-ounce cans and jars for every pound sold in 3½-ounce jars, under proportional pricing and identical display.

RESPONSE TO PRICE AND ADVERTISING

Prices of macadamia nuts for the test sales were established at 79 cents and 89 cents per 6-ounce can. Seventy-nine cents was determined to be the minimum price which would cover production, processing, and marketing costs, with the product marketed in large volume through regular channels of distribution. The 89-cent price was considered sufficiently high in relation to the minimum to permit some determination of price elasticity. A price in excess of 89 cents was considered higher than would be expected to prevail once the market is fully developed, and hence was not considered. Stores were paired for pricing and in most instances prices were held at either 79 cents or 89 cents during the duration of the market tests. Sales averaged 33 percent higher in 79-cent stores than in 89-cent stores in Redlands during the period in which Redlands was used as a control for advertising research. However, in Sacramento, additional sales from advertising more than offset the increased sales resulting from the reduction in price from 89 cents to 79 cents. With an advertising expenditure of 6 cents per can[3/] in Sacramento during 1960-1961, combined sales in supermarkets at 79 cents and 89 cents per 6-ounce can averaged 56 pounds annually per 1,000 persons (0.9 ounces per capita) (Table 2). Sales in Redlands during the same period, but with no advertising, averaged 22 pounds annually per 1,000 persons. In order to make further comparisons, it was necessary to adjust the Sacramento sales downward to indicate what the level might have been if all macadamias in Sacramento had been priced at 89 cents, in order to allow a sufficient margin to take care of the advertising expenditure. Since approximately two-thirds of the sales in Sacramento were at 79 cents and one-third at 89 cents and considering the fact that sales at 79 cents were one-third higher than at 89 cents, the 56-pound figure was reduced by 22 percent to 44 pounds. Using these relationships, the reduction in price from 89 cents to 79 cents with no advertising resulted in a 33-percent increase in sales. But maintaining the price at 89 cents and spending 6 cents per 6-ounce can on advertising resulted in a 100-percent increase in sales as compared with no advertising based on the 1960-1961 test period.

Thus, the effect of advertising as well as price on the level of sales is clearly indicated. Theoretically, advertising should be carried to the point where the last increment of advertising expenditure is equal to the additional return above the resulting additional costs and normal profit margins. In actual practice and in tests of the type on which this study is based, it is necessary to make some assumptions regarding the optimum advertising appropria-

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3/ Computed on the basis of full distribution in the area served by Sacramento television.

Table 2. Per-capita sales of macadamia nuts and proportion of sales of nuts in relation to competing nuts in grocery stores, Sacramento, Redlands, Riverside, and San Bernardino, 1959-1960 to 1964-1965[a/]

City and item	1959 to 1960	1960 to 1961	1961 to 1962	1962 to 1963	1963 to 1964	1964 to 1965	Weighted annual averages for period of years indicated
Sacramento, 1960-61 to 1963-64							
Per capita sales of macadamia nuts in pounds per 1,000 persons	--	56	38	34	26	--	39
Macadamia sales as percentage of cashew sales	--	89	48	39	25	--	53
Macadamia sales as percentage of mixed nut sales	--	51	27	28	17	--	32
Macadamia sales as percentage of all peanut sales	--	25	13	9	6	--	14
Redlands, 1959-60 to 1964-65							
Per capita sales of macadamia nuts in pounds per 1,000 persons	11	22	23	24	22	20	22
Macadamia sales as percentage of cashew sales	14	40	30	18	18	17	21
Macadamia sales as percentage of mixed nut sales	15	32	28	27	24	22	25
Macadamia sales as percentage of all peanut sales	3	6	5	5	3	4	4
Riverside, 1961-62 to 1964-65							
Macadamia sales as percentage of cashew sales	--	--	21	43	28	22	28
Macadamia sales as percentage of mixed nut sales	--	--	19	33	30	26	29
Macadamia sales as percentage of all peanut sales	--	--	3	5	4	4	4
San Bernardino, 1961-62 to 1964-65							
Macadamia sales as percentage of cashew sales	--	--	11	17	22	20	18
Macadamia sales as percentage of mixed nut sales	--	--	8	21	30	21	19
Macadamia sales as percentage of all peanut sales	--	--	2	4	3	3	3

a/ Fiscal year extending from July 1 through June 30.

tion. As previously indicated, the test results showed that in 1960-1961 sales of macadamia nuts per 1,000 capita in Sacramento amounted to an adjusted value of 44 pounds at 89 cents oer 6-ounce can with an advertising expenditure of 6 cents per can. In Redlands during 1960-1961 sales amounted to 22 pounds per 1,000 capita at a price of 79 cents per 6-ounce can, but with no advertising. In this instance, advertising of the product and raising the price to cover the advertising expenditure was obviously the more economic procedure. However, inasmuch as the same level of advertising was not carried out the following year, there is no assurance that sales would have continued at that level if the rather intensive advertising program had been continued. An unknown proportion of first-time purchases were one-time curiosity purchases.

By lowering the advertising appropriation from 6 cents to 3 cents per 6-ounce can during 1961-1962, sales dropped to 38 pounds per 1,000 capita in Sacramento as previously indicated in Table 2. At the same time, in Redlands, which remained as a control with no advertising, sales increased from the 1960-1961 level of 22 pounds per 1,000 capita to 23 pounds in 1961-1962 under the same pricing as in Sacramento. With no further advertising in Sacramento, sales per 1,000 capita declined further to 34 pounds in 1962-1963 and 26 pounds in 1963-1964. Sales in Redlands per 1,000 caipta reached a high of 24 pounds in 1962-1963 and declined to 22 pounds in 1963-1964 and 20 pounds in 1964-1965. The somewhat milder decline in Redlands during the last two years of the test was attributed to moderate TV advertising in Los Angeles during 1963 and 1964 over channels which served Redlands and to a limited number of store demonstrations on the Redlands area. Radio advertising in Los Angeles by commercial firms during that period was not considered to have a measurable effect on Redlands sales.

It seems evident that although intensive TV advertising had a marked immediate effect on sales of macadamia nuts, there was apparently little carryover effect. Furthermore, there is good indication that the heavy response to the intensive TV advertising in Sacramento was due in part to the fact that the advertising reached large numbers of people who had learned about macadamia nuts while on trips to Hawaii.

On the basis of these results, it appears reasonable to assume that macadamia nut sales in grocery stores of approximately 38 pounds per 1,000 capita can be maintained with a moderate advertising expenditure of 3 cents per 6-ounce can. This would permit a minimum price of 79 cents per 6-ounce can in channels of distribution where the number of handlers and markups is at a minimum, such as direct sales by processors to large chains. For more costly channels of distribution the minimum price after full market development may remain as high as 89 cents,[4/] excluding gourmet channels which would, of course, necessitate a considerably higher minimum price to the consumer.

In view of the above analysis, determinations of the market potential in this study are based on a price range of 79 cents to 89 cents per 6-ounce can and an advertising expenditure of 3 cents per can.

4/ These prices were determined in accordance with economic conditions at the time of the tests. As the nation undergoes inflation, the projected prices should be increased accordingly.

Table 3. Seasonal variation in sales of macadamia nuts, Redlands and Sacramento, California

City and years	Index of sales for 4-week periods[a/]												
	June to July	July to Aug.	Aug. to Sept.	Sept. to Oct.	Oct.	Nov.	Dec.	Jan.	Jan. to Feb.	Feb. to March	March to April	April to May	May to June
Sacramento													
3-year annual average 1960-61 through 1962-63	90	91	121	96	87	111	204	126	75	74	62	92	72
Redlands													
4-year annual average 1959-60 through 1962-63	68	85	91	86	75	112	177	113	100	93	105	100	96

a/ Percentage each 4-week period is of the mean 4-week period.

SEASONALITY OF SALES

Macadamia nut sales both in Redlands and Sacramento were quite uniform seasonally except for peaks in November, December, and early January and sales at a somewhat lower-than-average level during the spring and summer months (Table 3). Sales during December were approximately double those of the average month (4-week period). It is readily apparent that the holiday season from Thanksgiving through New Year's Day offers the best time for prominent display and advertising. Most of the television advertising during the second year of the Sacramento tests was conducted during and just prior to this period.

ANALYSIS OF COMPARATIVE SALES OF MACADAMIAS AND COMPETING NUTS

A combination of two methods was used in expanding test area sales in the projection of total sales of macadamia nuts in the United States: (1) the percentages of sales of macadamia nuts in relation to competing nuts in the test areas were applied to national sales of the competing nuts and (2) per-capita sales of competing nuts in the test areas were applied to the total United States population.

As far as the movement of macadamia nuts through grocery stores is concerned, direct expansion of test area sales and expansion based on the ratio of macadamia nut sales to cashew and mixed nut sales gave similar results at the national level. But in projecting sales of macadamia nuts for uses and in containers for which data were not available during the test period, it was necessary to estimate how macadamia nuts would fare in relation to competing nuts.

Expansions of macadamia nut sales from test areas to the national level under intensive and under moderate advertising programs and under a controlled situation with no advertising are shown in Table 4.

Expansions of test area results to the national level indicated potential sales under economic conditions prevailing at the time of the tests of 26 million pounds at an advertising cost of 6 cents per 6-ounce can, 19.5 million pounds at an advertising cost of 3 cents per can, and 12.5 million pounds under controlled conditions with no advertising (Table 4). Sales in grocery stores in test areas were expanded directly to the national level on the basis of per-capita consumption in the test areas. The national figures for all other outlets were determined from the sales relationships of macadamia nuts to other nuts in the test areas. The appropriate multiplers were then applied to national sales of competing nuts through various outlets in order to assimilate national data for macadamias. All outlset for macadamia nuts were considered feasible under existing conditions except for indicated potential sales in plastic bags and in-shell.

Inasmuch as a reasonably heavy advertising program such as that indicated in column I of Table 4 (6 cents per can) would bring about a certain proportion of one-time curiosity purchases, with an eventual levelling off of sales, the results of column II (3 cents per can) are considered to constitute more reasonable bases for long run projections. Column III (with no advertising) would be unrealistic to the other extreme. Thus, in making projections to a specified future date (1975 in this instance), the results in column II are used as a basis for the projections.

Table 4. Expansions of macadamia nut sales to the national level from test area sales at time of test

	I Advertising cost 6¢ per can	II Advertising cost 3¢ per can	III No advertising except display
	Millions of pounds	Millions of pounds	Millions of pounds
A. Canned macadamias in groceries only[a/]	10.0	7.0	3.5
B. All non-grocery outlets for shelled macadamias in cans or jars[b/][c/]	7.0	5.2	3.0
C. 10 percent of mixed nuts in cans and jars, groceries plus other outlets[c/]	2.0	2.0	2.0
D. Bagged macadamias, all outlets[c/]	3.0	2.0	1.0
E. Confectionery and bakery outlets[c/]	3.0	2.5	2.0
F. In-shell outlets[c/]	1.0	1.0	1.0
G. All outlets[c/]	26.0	19.5	12.5
H. All outlets not including bagged macadamias[c/]	23.0	17.7	11.5

a/ Direct expansion.
b/ All other outlets, including drug stores, department stores, institutional outlets, nut shops, candy stores, bars, etc.
c/ Based on sales relationships to other nuts in the test areas.

Table 5 is an expansion of Table 4 based on a moderate advertising program of 3 cents per 6-ounce can and an estimated population of 230,415,000 for the United States in mid-1975. This table is designed to be used as a guide to orderly expansion of Hawaii's macadamia nut industry. Acreage should be expanded in anticipation of a market for the various outlets for macadamias only as the realization of those outlets appears certain by the time the additional trees would be expected to come into bearing.

Table 5 indicates a potential United States market for 23,600,000 pounds of macadamias for all outlets in 1975. Production to supply this market would require 15,000 acres at a projected yield of 1,500 pounds of shelled nuts per acre. At the prevailing lower yield of the older varieties, a considerably larger acreage would, of course, be required. However, because there are certain limiting factors that prevent immediate sales through one or more outlets, there is need for pointing out these limitations and for paring down the above projection to a somewhat more conservative figure. This does not, of course, negate the possibility that improved technology in preservation and marketing may bring about a potential in excess of that indicated above. As the industry develops and the 1975 acreage goal is approached, further projections should be made in light of technology and market conditions existing at that time.

Further development of the market for salted macadamias in cans and jars should proceed with a minimum of difficulty.

As yet unexploited but with an excellent immediate potential is the market for macadamias with salted mixed nuts in cans and jars. There is, of course, no way of determining what proportion of mixed nut sales will eventually be allocated to macadamias. But the use of macadamias as component in canned mixed nuts appears certain. It seems reasonable to assume that macadamias will eventually constitute 10 percent of the mixed nut pack. Price and industry promotion are important factors to consider in this respect. If the macadamia could gain placement as 10 percent of mixed nuts in cans in grocery stores, this would amount to 2.4 million pounds nationally by 1975, based on an expansion of test city results.

The sale of macadamia nuts in standard plastic bags has not yet been successful because of the low moisture resistance of roasted macadamias. The macadamia remains edible in plastic bags for a maximum period of only two to three months. The Department of Food Science and Technology at the University of Hawaii has, however, developed a laminated plastic and aluminum container with sufficient strength to retain a vacuum. This container preserves the macadamia as well as the tin can, but has the disadvantage of being non-transparent. However, it is believed that a clear plastic container with vacuum strength will be avaliable at an early date. This would be more competitive with existing plastic bags and would undoubtedly result in some increase in the sale of macadamia nuts. Thus, expansion of production for realization of projected sales of 2.4 million pounds in plastic bags must await development of a satisfactory container and should not be initiated until a satisfactory container for this type of outlet has been accepted by the industry.

To a certain extent the market for miscellaneous uses of macadamia nuts such as in candies, bakery products, and as an ice cream topping has already been developed. Further development will come about through greater promotional effort. These outlets should certainly be given consideration in contemplating

Table 5. Projected sales, value of output, and acreage requirements for macadamia nuts for the United States market in 1975

	Projected sales (shelled) column II, table 5, plus 20%[a]	Farm value 20¢/pound in shell (60¢/pound shelled)	FOB Hilo value ($1.50/pound shelled)	Acreage required (yield per acre 1,500 pounds shelled)
	Millions of pounds	Millions of dollars	Millions of dollars	Thousands of acres
A. Canned macadamias in groceries only[a]	8.4	5.4	12.6	5.6
B. All non-grocery outlets for shelled macadamias in cans or jars[b]	6.2	3.7	9.3	4.1
C. 10 percent of mixed nuts in cans and jars, groceries plus other outlets	2.4	1.5	3.6	1.6
D. Bagged macadamias, all outlets	2.4	1.5	3.6	1.6
E. Confectionery and bakery outlets	3.0	1.8	4.5	2.0
F. In-shell outlets	1.2	0.7	1.8	0.8
G. All outlets	23.6	14.6	35.4	15.7
H. All outlets not including bagged and in-shell macadamias	20.0	12.0	30.0	13.3

a/ Moderate advertising and promotion (3 cents per 6-ounce tin). The 20 percent increase is to adjust for estimated population increase in the United States from the test period to 1975.

b/ All other outlets, including drug stores, department stores, institutional outlets, nut shops, candy stores, bars, etc.

the market potential for the industry. Further research is needed on confectionery and bakery outlets for macadamias.

In-shell macadamias are on the shelves in some stores in Honolulu but are moving out at a very slow rate, partly because of the extremely hard shell, which requires a special nutcracker. Until a softer-shelled variety is developed, it is doubtful that the in-shell outlet will make a significant contribution to the market for macadamia nuts.

In view of the present adaptation of macadamia nuts to various market outlets, a market for 20,000,000 pounds in 1975 (item H, Table 5) seems to be a reasonable projection. This would require 13,300 acres at an estimated yield for new plantings of 1,500 pounds of shelled nuts per acre. It would return an estimated $12 million to producers at 60 cents per pound shelled basis (20 cents per pound unshelled) and provide an f.o.b. Hilo value of $30 million. As developments take place enabling distribution of macadamia nuts through a greater variety of outlets, including foreign markets, production goals may be expanded accordingly. The market should be continually researched as the industry develops and adjustments in acreage projections may be made as new findings are brought to light.

SUMMARY AND CONCLUSIONS

A large market potential for macadamia nuts is conclusively indicated. The exact amount which can be sold will be determined to a large extent by market development and product improvement. This research indicates that the Mainland salted nut market could utilize 20 million pounds of macadamia nuts annually by 1975 even if the bagged and in-shell outlets fail to materialize. This would require 13,300 acres and would return $12 million annually to producers and $30 million annually to Hawaii's economy.

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